CHAPTER 3. HISTORY, AUTHORITIES, AND RESPONSIBILITIES

300.   GENERAL CONSIDERATIONS. The FAA, as one of the major users of the RF spectrum in the United States, has an important national role in the management of frequencies. In turn, the nation has a major responsibility to the rest of the world in the orderly development and application of the RF spectrum within the international community. To acquaint the reader with the need for effective spectrum management within the agency, this chapter presents an historical background of the development and current national and international administrative authorities and responsibilities. Although it complicates the task, agency spectrum management is bound by many international treaties as well as our own United States dual spectrum control entities: the Federal Communications Commission (FCC) and the National Telecommunications and Information Administration (NTIA).

301.   INTERNATIONAL ORGANIZATIONS.

> **a. International Telecommunication Union (ITU)**.

>> **(1) ITU**. The ITU is an arm of the United Nations, with its major functions in Geneva, Switzerland. It is the fundamental authority for spectrum allocation and management. The ITU currently has a membership of 173 nations, including the major powers. The organization is one of the oldest international groups in existence. In 1932, it became the successor to the International Telegraph Union which was created in 1865.

>> **(2) ITU Authority**. The ITU expresses its authority through the same channels as any other multilateral treaty system. Regulations adopted by this international body must then be ratified further and signed by the various administrations (nations) represented. These regulations are developed at conferences and through negotiation where representatives of member nations formulate recommendations which are presented to the plenary body in session for formal voting action leading to adoption. The adopted policies are then published and include detailed regulations and policies in such areas as terminology, assignment and use of frequencies, band allocations, frequency registration, technical specifications, measures against interference, administrative provisions for stations and distress and safety procedures.

>> **(3) Structure of the Union**. The ITU was reorganized in 1993. While most of the functions of the former structure remain, nearly all have new names and some responsibilities and authorities have been assigned to new functional groups. See figure 3-1 for a block diagram of the major functions of concern to the FAA. Some major organizations of the Union are as follows:

>>> **(a) Plenipotentiary Conference**. Meeting at intervals of normally not less than 5 years, the Plenipotentiary Conference determines the general policies for fulfilling the purposes of the Union. It reviews the work of the Union and revises the Convention if considered necessary.

>>> **(b) World Radiocommunication Conference (WRC)**. A WRC is normally convened every two years to consider specific radiocommunication matters. A WRC may revise the Radio Regulations, or deal with any radiocommunication matter of worldwide
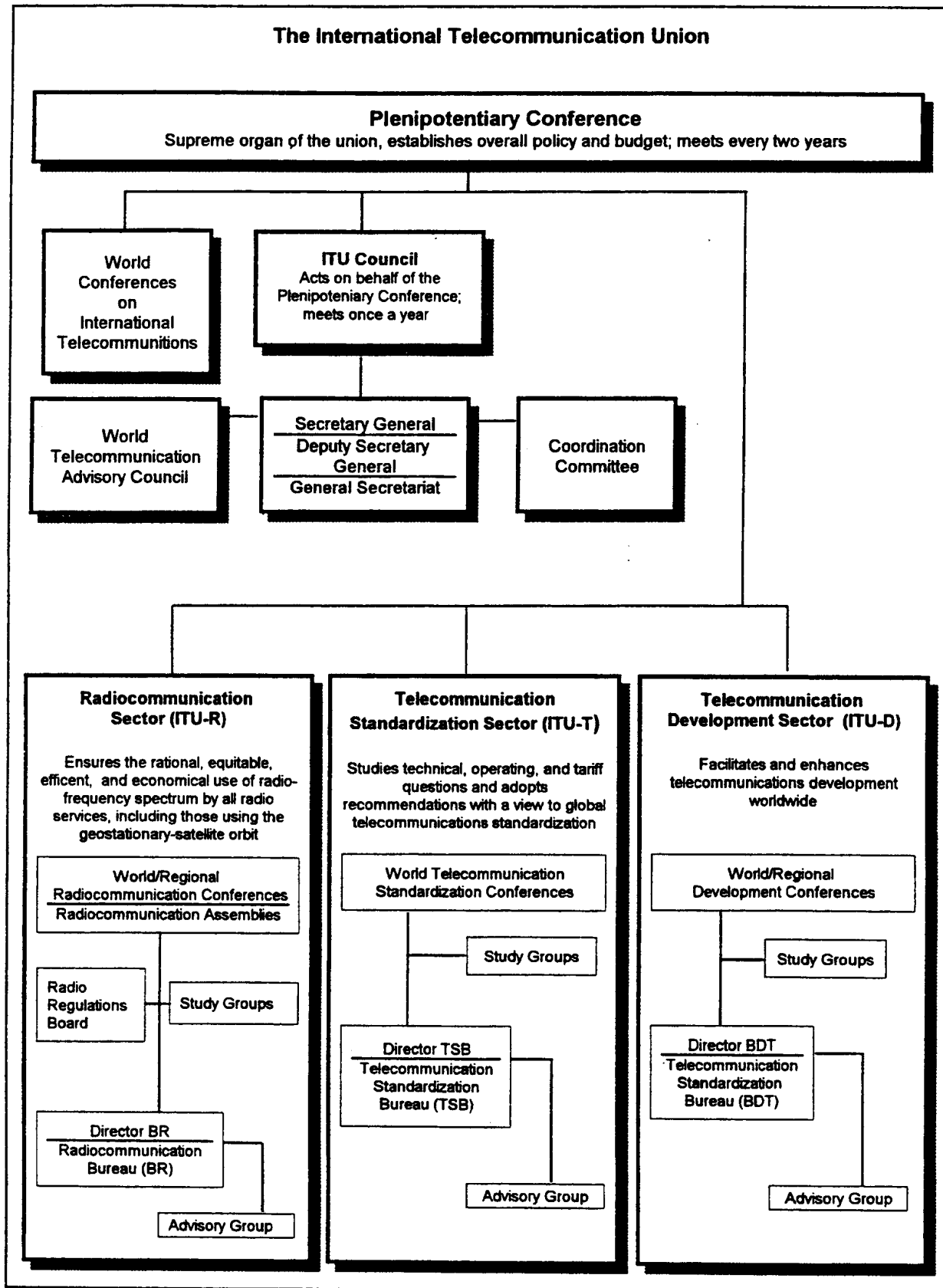
character in accordance with its agenda. The Radio Regulations constitute an international treaty on radiocommunication and cover the use of the radio frequency spectrum by radiocommunication services.

       (c) Council. The Council sets the final agenda for a WRC, normally two years before the conference is held.

       d) Secretary General. The Secretary General is responsible to the Council for external relations, public information and other directed functions. The office provides secretarial services for all conferences and publishes the monthly journal services in several languages for distribution to member nations.

       (e) Radiocommunication Sector. The Radiocommunication Sector is one of three major Sectors directly under the authority of the Plenipotentiary Conference and the Council. Its primary functions are to provide for international frequency registration, technical and administrative support to radiocommunication study groups, to provide conference and assembly support and to provide seminars and training.

FIGURE 3-1. PARTIAL ORGANIZATIONAL CHART OF THE ITU

The International Telecommunication Union

Plenipotentiary Conference
Supreme organ of the union, establishes overall policy and budget; meets every two years

World Conferences on International Telecommunitions

ITU Council
Acts on behalf of the Plenipoteniary Conference; meets once a year

World Telecommunication Advisory Council

Secretary General
Deputy Secretary General
General Secretariat

Coordination Committee

Radiocommunication Sector (ITU-R)

Ensures the rational, equitable, efficent, and economical use of radio-frequency spectrum by all radio services, including those using the geostationary-satellite orbit

World/Regional Radiocommunication Conferences
Radiocommunication Assemblies

Radio Regulations Board

Study Groups

Director BR
Radiocommunication Bureau (BR)

Advisory Group

Telecommunication Standardization Sector (ITU-T)

Studies technical, operating, and tariff questions and adopts recommendations with a view to global telecommunications standardization

World Telecommunication Standardization Conferences

Study Groups

Director TSB
Telecommunication Standardization Bureau (TSB)

Advisory Group

Telecommunication Development Sector (ITU-D)

Facilitates and enhances telecommunications development worldwide

World/Regional Development Conferences

Study Groups

Director BDT
Telecommunication Standardization Bureau (BDT)

Advisory Group

b. International Civil Aviation Organization (ICAO). ICAO is to the international scene as FAA is to the national, except that it is only advisory, without authority to enforce its recommendations. Member nations, including the United States, strive for strict adherence to ICAO standards. See figure 3-2. The following is a summary of the ICAO goals:

(1) **Ensure safe and orderly growth** of international aviation throughout the world.

(2) **Encourage the arts of aircraft design** and operation for peaceful purposes.

(3) **Encourage the development of airways**, airports and air navigation facilities for international civil aviation.

(4) **Meet the needs of the people** of the world for safe, regular, efficient and economical air transport.

(5) **Prevent economic waste** caused by unreasonable competition.

(6) **Ensure that rights** of contracting nations are respected fully and those nations given equal opportunity.

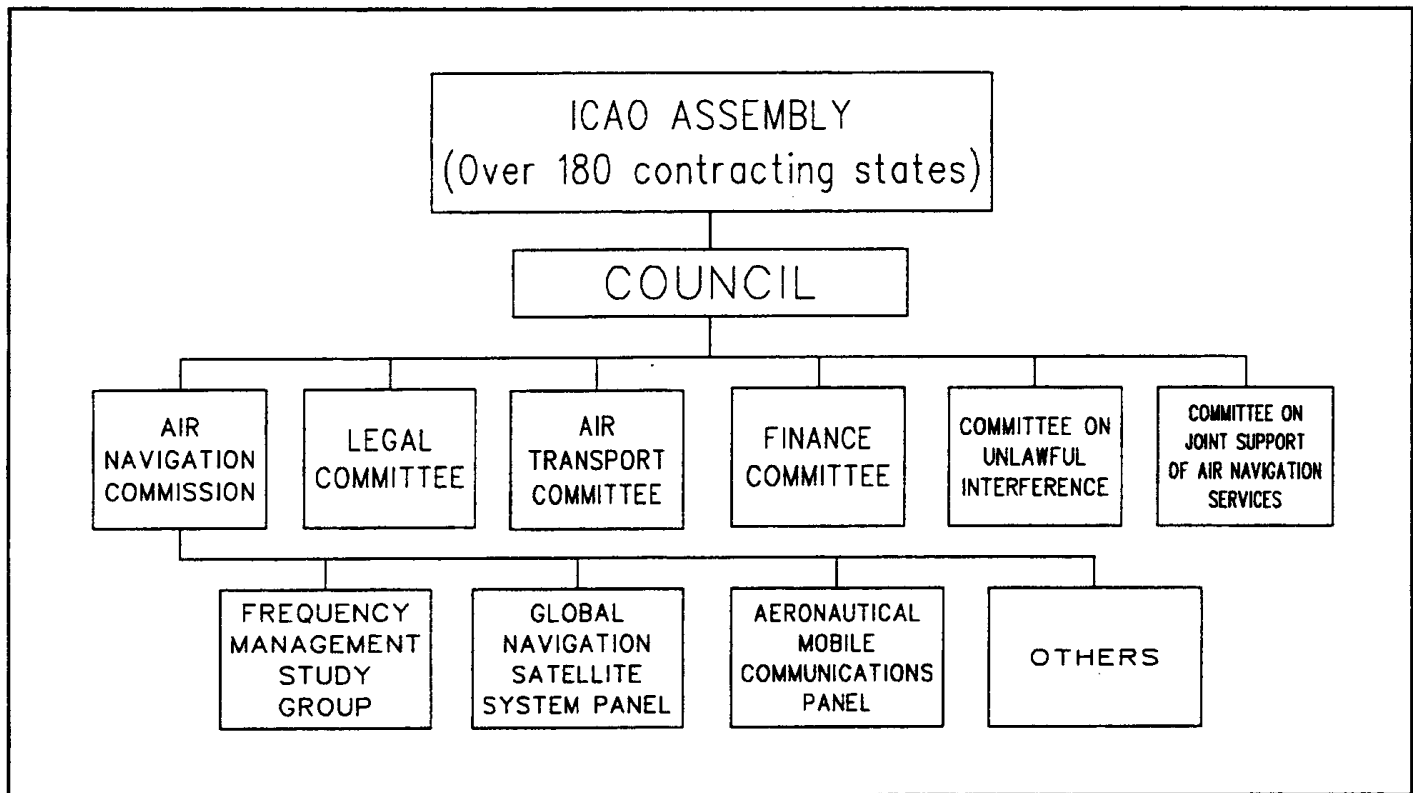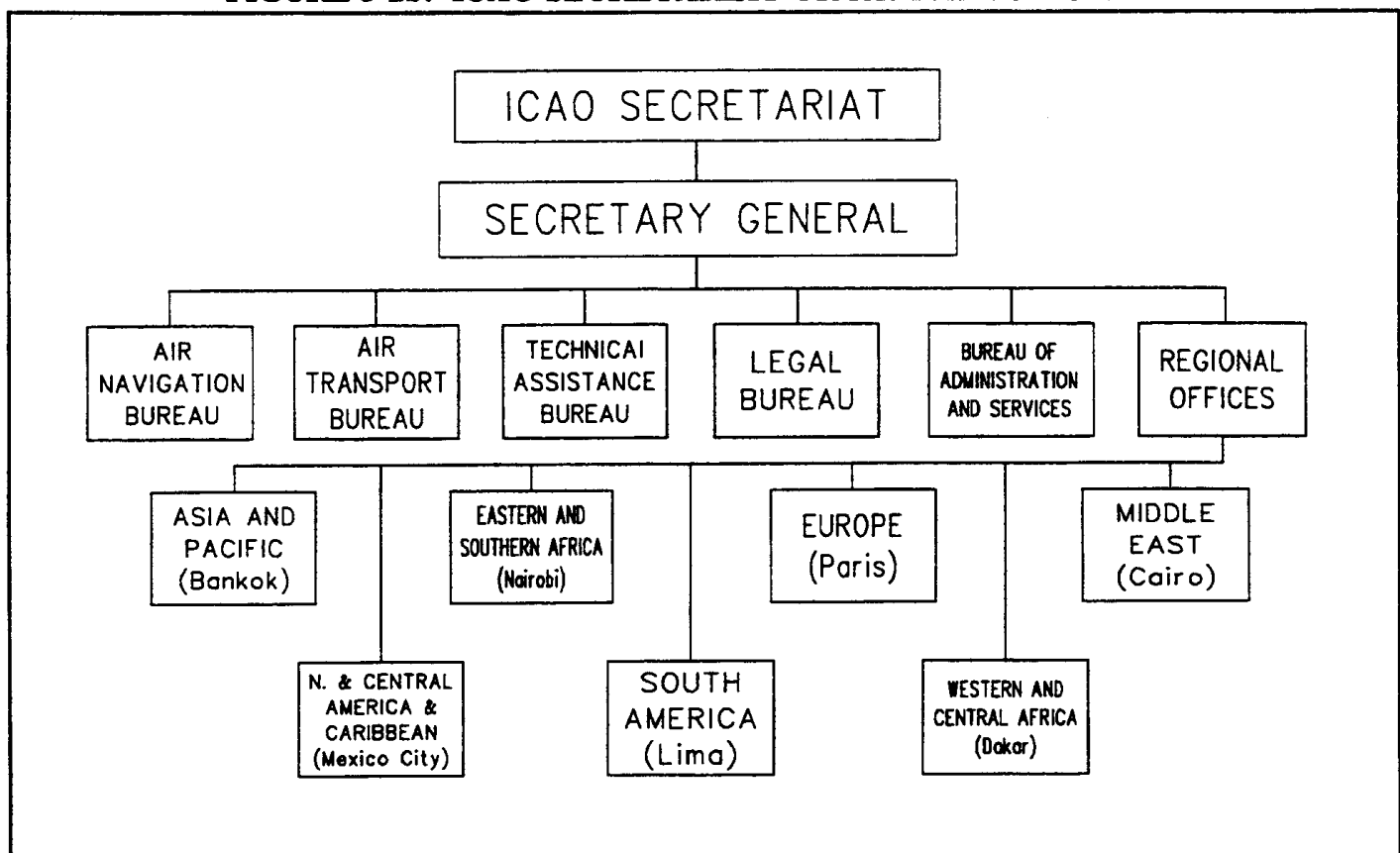(7) **Promote safety of flight** in international air navigation.

(8) **Annexes to the ICAO Convention** (the "Chicago Convention" which established ICAO) establish international standards and recommended practices (SARP's) for aeronautical requirements such as licensing, airworthiness, security, air traffic, search and rescue, communications, etc. "Standards" are necessary for the safety or regularity of international aviation and "recommended practices" are desirable for the safety or regularity of international aviation.

(9) **ICAO operates and functions as follows**:

(a) **The Assembly** is the sovereign body of ICAO and includes over 180 Contracting States. It meets at least once every three years and handles broad policy issues. Each contracting State has one vote on an issue.

(b) **The Council** is the governing body of ICAO. It is a resident body comprised of 33 representatives from Member States elected by the Assembly for three-year terms. One of the primary duties of the Council is to adopt SARP's and incorporate these as Annexes to the Convention to achieve international uniformity/standardization and improve air safety, efficiency and regularity of flight. The U.S. has a permanent representative on the Council.

(c) **The Air Navigation Commission (ANC)** is comprised of 15 qualified technical experts from Member States appointed by the Council. ANC is responsible for examining, coordination and planning all of ICAO's work in the air navigation field as is the principal body concerned with developing SARP's. The ANC forms panels and study groups

FIGURE 3-2a. ICAO ASSEMBLY ORGANIZATION CHART

ICAO ASSEMBLY
(Over 180 contracting states)

COUNCIL

| AIR NAVIGATION COMMISSION | LEGAL COMMITTEE | AIR TRANSPORT COMMITTEE | FINANCE COMMITTEE | COMMITTEE ON UNLAWFUL INTERFERENCE | COMMITTEE ON JOINT SUPPORT OF AIR NAVIGATION SERVICES |

FREQUENCY MANAGEMENT STUDY GROUP

GLOBAL NAVIGATION SATELLITE SYSTEM PANEL

AERONAUTICAL MOBILE COMMUNICATIONS PANEL

OTHERS

FIGURE 3-2b. ICAO SECRETARIAT ORGANIZATION CHART

ICAO SECRETARIAT

SECRETARY GENERAL

| AIR NAVIGATION BUREAU | AIR TRANSPORT BUREAU | TECHNICAL ASSISTANCE BUREAU | LEGAL BUREAU | BUREAU OF ADMINISTRATION AND SERVICES | REGIONAL OFFICES |

ASIA AND PACIFIC (Bankok)

EASTERN AND SOUTHERN AFRICA (Nairobi)

EUROPE (Paris)

MIDDLE EAST (Cairo)

N. & CENTRAL AMERICA & CARIBBEAN (Mexico City)

SOUTH AMERICA (Lima)

WESTERN AND CENTRAL AFRICA (Dakar)

consisting of outside technical experts to study specific issues and make recommendations to the Council. The U.S. has a permanent member who historically has an FAA background.

1 While ASR Monitors work on nearly all ICAO Panels, the two which routinely address radio spectrum issues and on which ASR participates are the Aeronautical Mobile Communications Panel (AMCP) and the Global Navigation Satellite System Panel (GNSSP).

2 AMCP studies aeronautical mobile communications issues and develops SARP's for air-ground communications, satellite communications and associated systems.   GNSSP is developing the SARP's for the future Global Navigation Satellite System (GNSS).

(d) The Air Transport Committee normally does not address radio spectrum issues. It is comprised of representatives from Member States who are appointed by the Council. Its work includes research and recommendations such as policy guidance on airport and route facility economics and management. It considers air transport issues in global conferences. The Air Transport Committee also forms panels and study groups to process its work.

(e) The Secretariat serves as ICAO's permanent administrative body. The Secretariat staff maintains ICAO documents and its bodies include the Air Navigation Bureau, the Aviation Security Branch and the Technical Assistance Bureau. The Secretariat also administers the Seven Regional ICAO Offices which develop and implement regional aviation initiatives.

302. NATIONAL ORGANIZATIONS - GENERAL. Each member nation of ITU is free to set up its own procedures for authorizing the use of the spectrum within its nation, but consistent with the international table of allocations approved by the last ITU conference. Exceptions may be taken to specific allocations, but a member nation must notify ITU and be subject to conflicting use by other member nations following the allocations.

a. United States International Relations. Within the United States, the State Department handles the international representation of the United States with full technical and administrative support by all United States agencies involved. The State Department acts as the ITU voting member. The vote represents the consensus of an extensive NTIA/FCC preparatory process, or when a consensus cannot be reached, the official position of the President. The State Department provides the liaison between the United States and other governments when conflicts arise over application of the ITU Radio Regulations.

b. United States Domestic Structure. The Communications Act of 1934, as amended, established a dual system of control of the spectrum within the United States. The FCC administers all the spectrum assigned to and operated by non-Federal agencies. The Act also specifies that all Federal agencies will have their spectrum needs administered and authorized by a separate agency, currently the NTIA in the Department of Commerce (DOC). Both agencies, FCC and NTIA, work together to formulate recommendations for national control of the spectrum, as well as supply the Department of State with a consensual position for international conferences.

c. FCC.

(1) **Jurisdiction**. The FCC has jurisdiction over all non-Federal Government spectrum and spectrum users in the United States. This includes not only broadcast, amateur, industrial, and civil aviation as it applies to licensing the operators and equipment, but also State and municipal government entities as well.
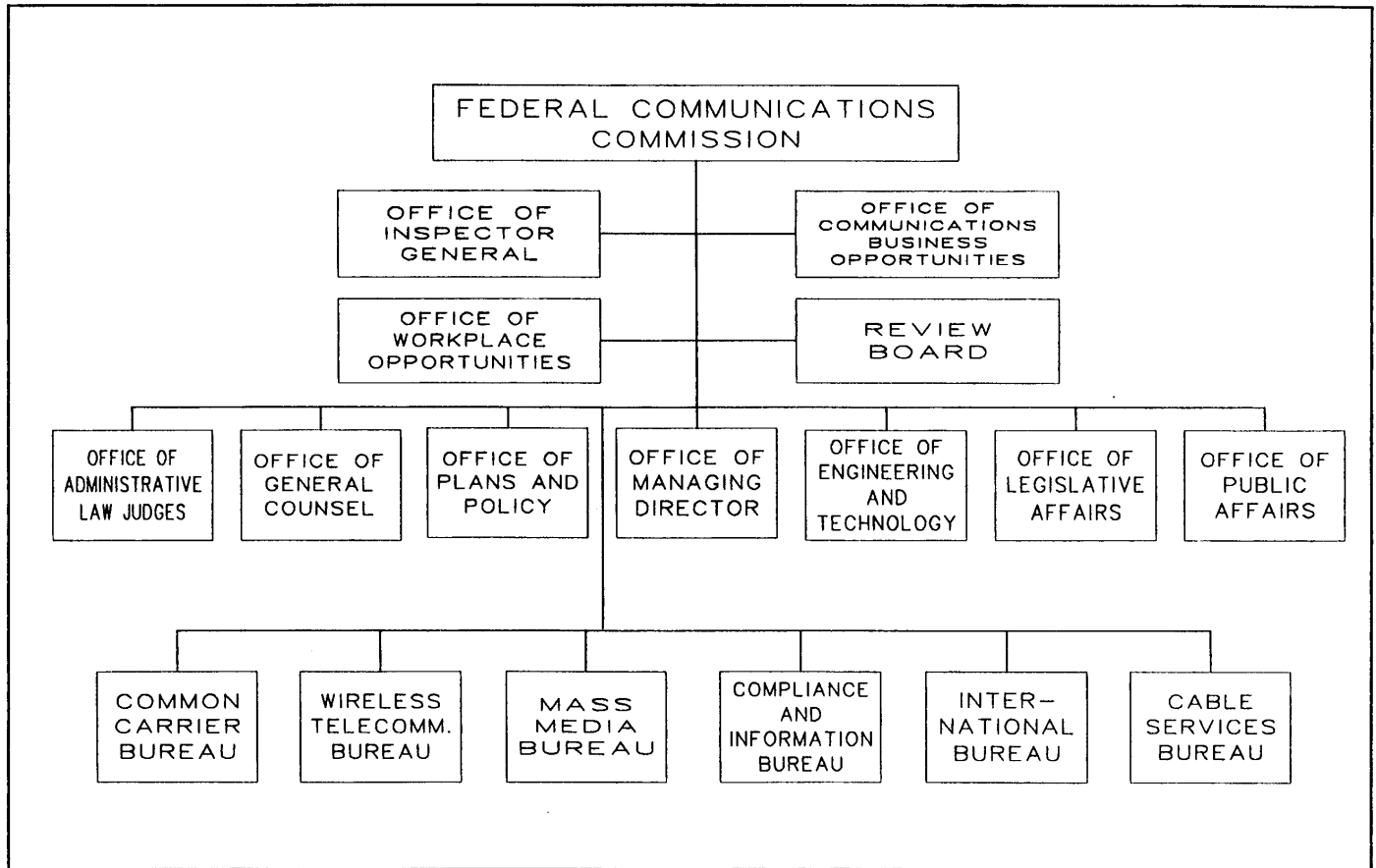
(3) **Organization**. The Commission is composed of five commissioners, appointed by the President with the advice and consent of the Senate. They serve 5-year staggered terms, so one term expires each year. There can be no more than three commissioners from the same political party. One of the members is appointed by the President to be Chair. A simplified block diagram of FCC organization is found in figure 3-3.
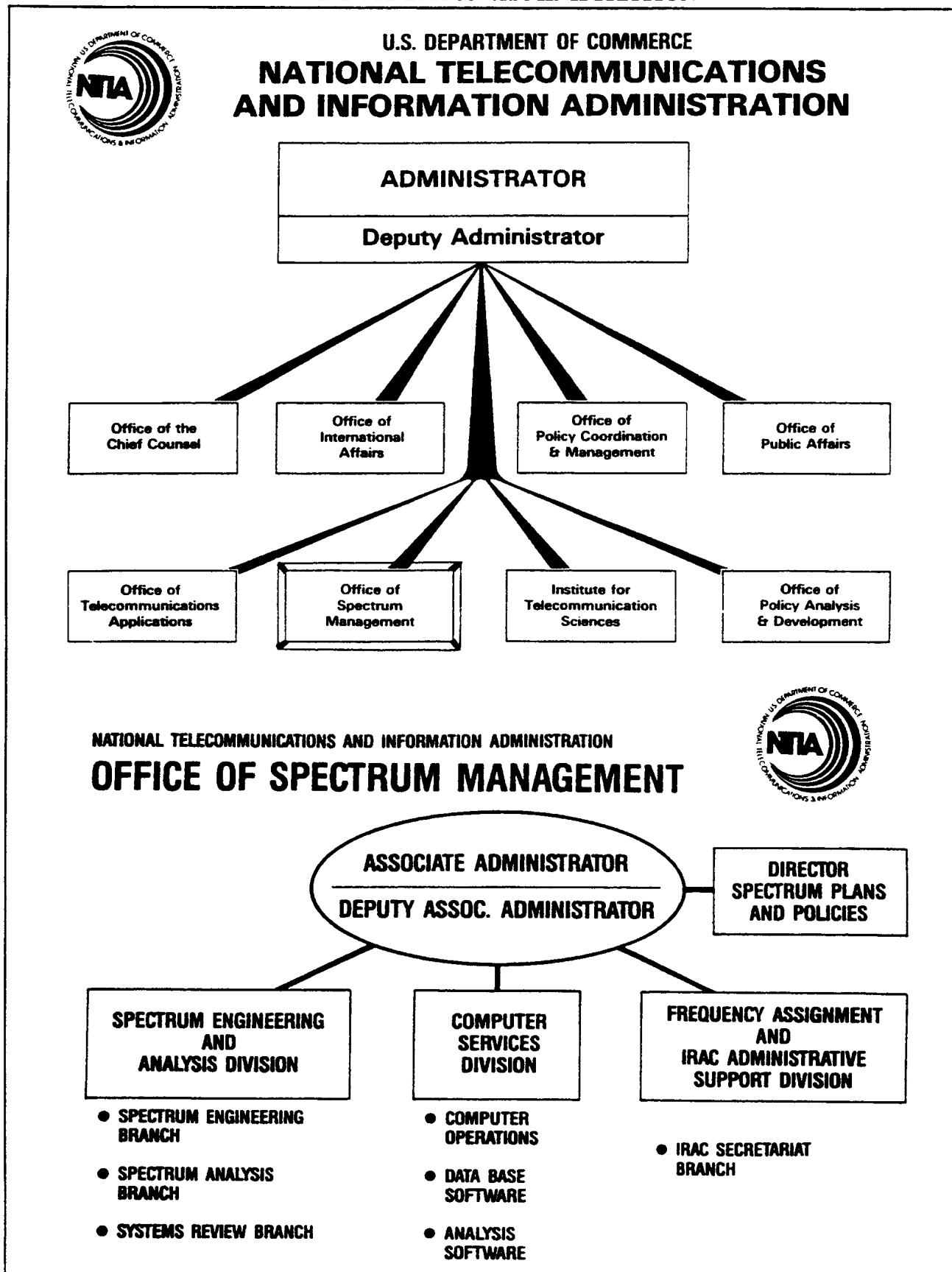
d. NTIA.

(1) **Jurisdiction**. NTIA has authority and responsibility for use of the Federal portion of the spectrum by all Federal agencies, including the DOD and the FAA. It is empowered by the same Act as FCC, but has only the Federal agencies' spectra to administer. NTIA and FCC work closely together, since a good portion of the radio spectrum is shared between Federal and non-Federal users requiring joint action. A block diagram of NTIA is shown in figure 3-4.

(2) **Responsibilities**. NTIA is responsible for administering that portion of the spectrum allocated to Federal use. It is empowered to authorize Federal agencies who show a need and meet the requirements to use the spectrum. They can also withdraw that authorization or modify it if required. NTIA is also bound by the ITU Radio Regulations. FAA's interface with NTIA is normally only at the Washington level.

FIGURE 3-3. FEDERAL COMMUNICATIONS COMMISSION

FEDERAL COMMUNICATIONS COMMISSION

OFFICE OF INSPECTOR GENERAL

OFFICE OF COMMUNICATIONS BUSINESS OPPORTUNITIES

OFFICE OF WORKPLACE OPPORTUNITIES

REVIEW BOARD

OFFICE OF ADMINISTRATIVE LAW JUDGES

OFFICE OF GENERAL COUNSEL

OFFICE OF PLANS AND POLICY

OFFICE OF MANAGING DIRECTOR

OFFICE OF ENGINEERING AND TECHNOLOGY

OFFICE OF LEGISLATIVE AFFAIRS

OFFICE OF PUBLIC AFFAIRS

COMMON CARRIER BUREAU

WIRELESS TELECOMM. BUREAU

MASS MEDIA BUREAU

COMPLIANCE AND INFORMATION BUREAU

INTER-NATIONAL BUREAU

CABLE SERVICES BUREAU

U.S. DEPARTMENT OF COMMERCE

NATIONAL TELECOMMUNICATIONS
AND INFORMATION ADMINISTRATION

ADMINISTRATOR

Deputy Administrator

| Office of the Chief Counsel | Office of International Affairs | Office of Policy Coordination & Management | Office of Public Affairs |

| Office of Telecommunications Applications | Office of Spectrum Management | Institute for Telecommunication Sciences | Office of Policy Analysis & Development |

NATIONAL TELECOMMUNICATIONS AND INFORMATION ADMINISTRATION

OFFICE OF SPECTRUM MANAGEMENT

ASSOCIATE ADMINISTRATOR

DEPUTY ASSOC. ADMINISTRATOR

DIRECTOR SPECTRUM PLANS AND POLICIES

SPECTRUM ENGINEERING AND ANALYSIS DIVISION

COMPUTER SERVICES DIVISION

FREQUENCY ASSIGNMENT AND IRAC ADMINISTRATIVE SUPPORT DIVISION

- SPECTRUM ENGINEERING BRANCH
- SPECTRUM ANALYSIS BRANCH
- SYSTEMS REVIEW BRANCH

- COMPUTER OPERATIONS
- DATA BASE SOFTWARE
- ANALYSIS SOFTWARE

- IRAC SECRETARIAT BRANCH

(3) **Organization**. The NTIA Administrator serves as the Special Assistant to the President for Telecommunications. NTIA is currently located in Washington in the DOC. It has no field offices, but in effect does have various "field representatives" in other agencies in the field. For instance, each FAA regional Frequency Management Officer (FMO) is the NTIA's field coordinator for all radar beacons and all radars within certain radar bands. This includes military and non-Federal radars and radar beacons.

(a) **Interdepartment Radio Advisory Committee (IRAC)**. The IRAC is one of the most important bodies which interfaces with FAA frequency management. Authorization for all FAA frequencies, including our Land Mobile networks comes through IRAC from NTIA. The IRAC is the working arm of NTIA, composed of 20 members, each an agency of the Federal Government, including FAA. See figure 3-5. FAA participates and provides technical expertise to all subcommittees of the IRAC.

FIGURE 3-5. PARTIAL ORGANIZATION CHART OF THE IRAC
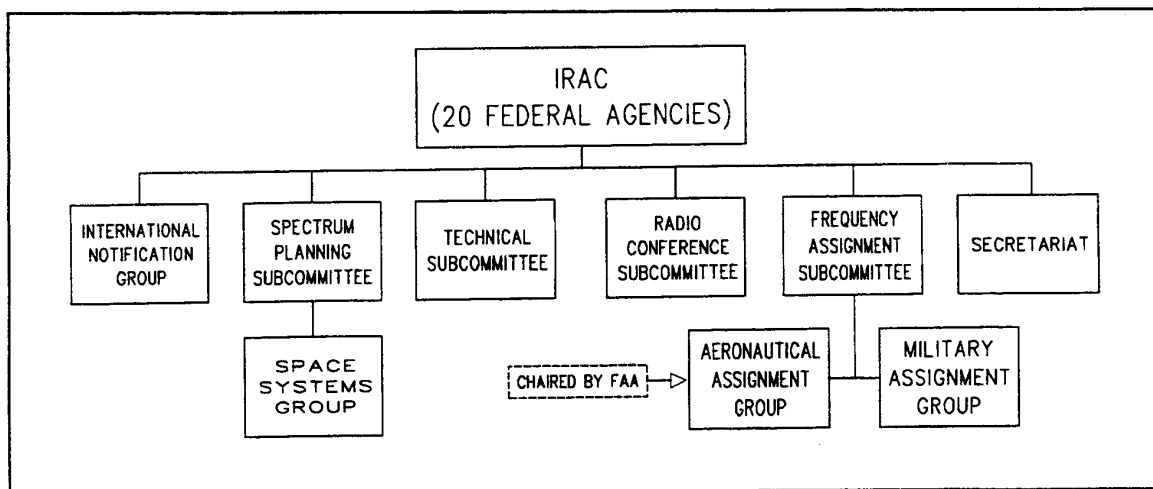
(b) **Spectrum Planning Subcommittee (SPS)**. The SPS carries out IRAC functions which relate to planning for the use of the electromagnetic spectrum. This includes the apportionment of spectrum space for the support of established or anticipated radio services, as well as the apportionment of spectrum space between or among Government and non-Government activities.

(c) **Technical Subcommittee (TSC)**. The TSC is a subcommittee of IRAC which examines the technical aspects of the use of the electromagnetic spectrum.
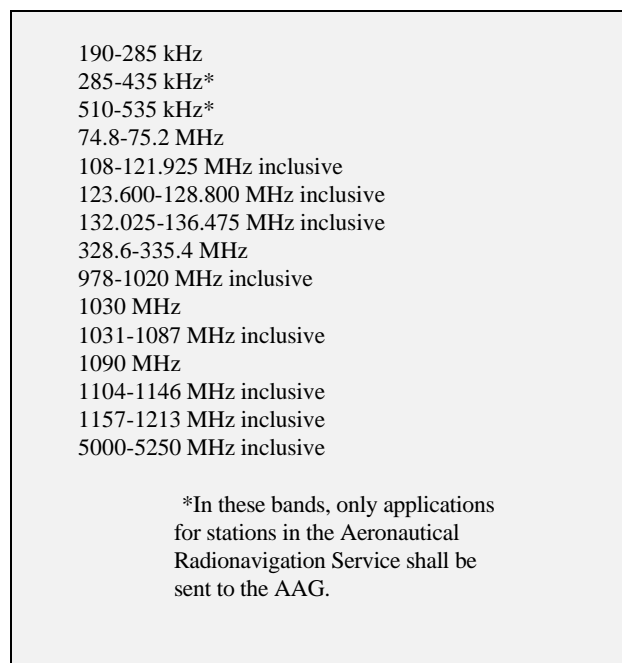
(d) **Radio Conference Subcommittee (RCS)**. The RCS advises the IRAC in those functions relating to preparing for ITU radio conferences. This includes the development of recommended U.S. proposals and positions.

(e) **Frequency Assignment Subcommittee (FAS)**. The FAS is an IRAC

subcommittee which operates to accomplish all the engineering and coordination for each agency's frequency requests. To facilitate its work, FAS has specialized groups to assist with the enormous task of checking and coordinating every frequency request. The following are the two most important groups to FAA:

     1. Aeronautical Assignment Group (AAG). The AAG, chaired by the FAA, handles only those frequencies which deal with aeronautical services, both Federal and non-Federal. In so doing, it can tentatively "authorize" frequencies in that service directly to the FMO in the region after assuring the request meets all IRAC and FAA requirements. Aeronautical frequencies approved by AAG must be approved by FAS before they become final. The frequency bands under AAG control are shown in figure 3-6.

FIGURE 3-6. AAG CONTROLLED BANDS

190-285 kHz
285-435 kHz*
510-535 kHz*
74.8-75.2 MHz
108-121.925 MHz inclusive
123.600-128.800 MHz inclusive
132.025-136.475 MHz inclusive
328.6-335.4 MHz
978-1020 MHz inclusive
1030 MHz
1031-1087 MHz inclusive
1090 MHz
1104-1146 MHz inclusive
1157-1213 MHz inclusive
5000-5250 MHz inclusive

    *In these bands, only applications for stations in the Aeronautical Radionavigation Service shall be sent to the AAG.

     2. Military Assignment Group (MAG). The MAG does the same work as AAG, except for the military fixed and mobile communications bands controlled by DOD, 225.000-328.600 MHz and 335.400-399.950 MHz only. FAA requests for use of those frequencies for A/G facilities must go through MAG for initial approval.

    (f) Field Coordinators. Because the IRAC lacks expertise in some areas, it needs field assistance in its enormous task of coordinating some operations. As a result, the FAA and the DOD Area Frequency Coordinators (AFC) are tasked with pre-coordination of some portions of the spectrum before the frequency request is submitted to FAS or IRAC.

     1. FAA Field Coordinators have responsibility for coordinating certain radar frequency bands. This entails the FMO's having to engineer each new radar or beacon request proposed for operation in their Region, whether civilian test, military, other Federal agency use or FAA. Once the frequency or (in the case of radar beacon) the Pulse

Repetition Rate (PRR) has been engineered, it must be given to ASR for submission to IRAC through channels. Those bands are shown in figure 3-7.

**FIGURE 3-7. BANDS UNDER COORDINATION CONTROL
OF FAA FIELD COORDINATORS**

1030   MHz Airborne Radar Beacons (Interrogators)
1090   MHz Ground Transponders
1215-1400 MHz Radar (typically en route radar)
2700-2900 MHz Radar (typically terminal and weather radar)
9000-9200 MHz Radar (typically DOD precision approach radar)

           2. DOD AFC's have a similar responsibility but for the telemetry bands 1435-1535 MHz and 2310-2390 MHz. FAA does not use these bands. DOD AFC responsibilities are covered in the NTIA Manual, chapter 8.

        (4) Spectrum chart. A wall size detailed graphic representation of the full spectrum is published by NTIA and is available from ASR upon request.

    e. FAA. The spectrum management function in FAA is totally within the purview of the Office of Spectrum Policy and Management. The latest edition of Orders 1100.1, FAA Organization - Policies and Standards, 1100.2, Organization - FAA Headquarters and 1100.5, FAA Organization - Field delineate the specific functions of the office. Figure 3-8 provides a block diagram of the ASR organization. Figure 3-9 lists the bands of frequencies with which FAA is concerned.
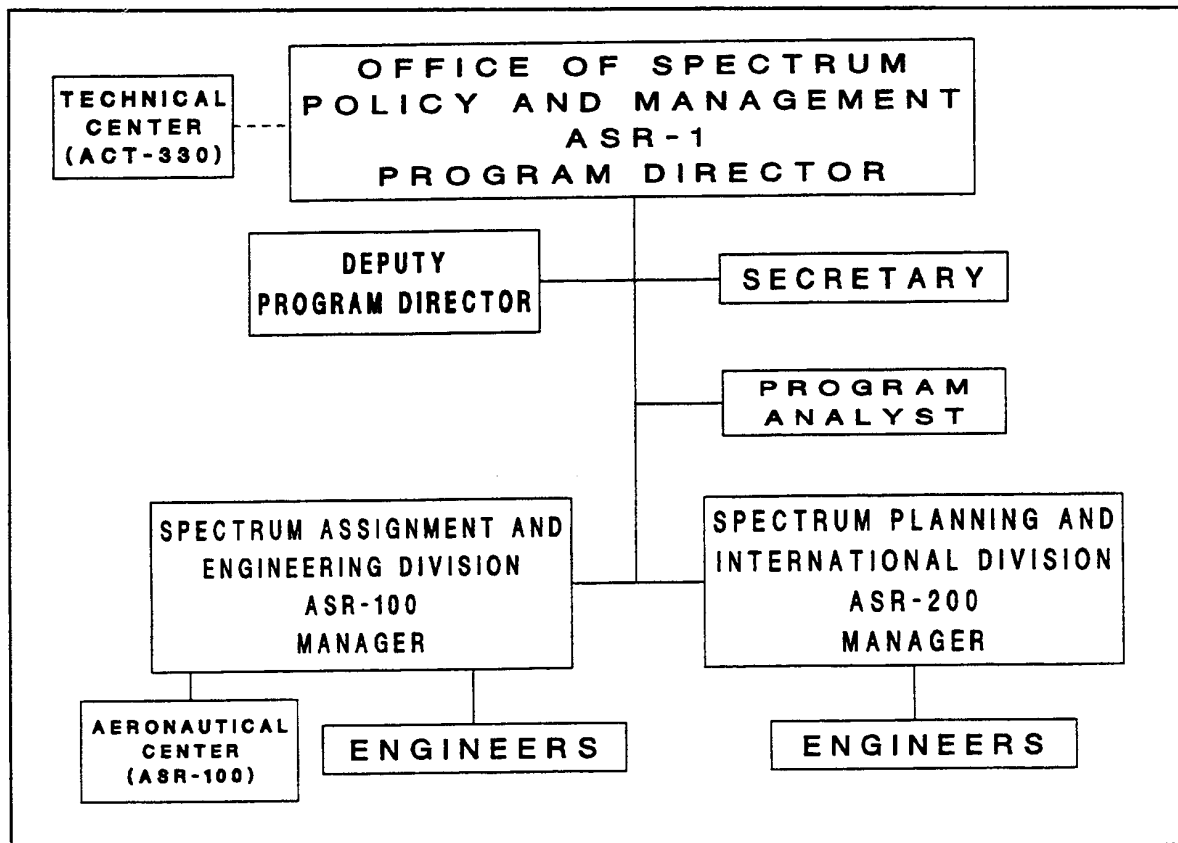
FIGURE 3-8. OFFICE OF SPECTRUM POLICY AND MANAGEMENT

FIGURE 3-9. SUMMARY OF FREQUENCY BANDS SUPPORTING AVIATION

```
            9 -   14    kHz   OMEGA Navigation System
           90 -  110   kHz   LORAN C Navigation System
   *       190 -  435   kHz   Nondirectional Beacon
   *       510 -  535   kHz   Nondirectional Beacon
          2100 - 28,000  kHz   High Frequency Communications
   *       74.8 - 75.2  MHz   NAVAID (Marker Beacon)
   *       108 -  118   MHz   NAVAID (VOR, ILS Localizer, SCAT-I))
   *       118 -  137   MHz   VHF Air/Ground Communications
           162 -  174   MHz   Fixed, mobile Communications
           225.0 - 328.6  MHz   UHF Air/Ground Communications
   *       328.6 - 335.4  MHz   NAVAID (ILS Glide Slope)
           335.4 - 399.9  MHz   UHF Air/Ground Communications
           406.0 - 406.1  MHz   Satellite Emergency Position Indicating Radio Bcn
           406.1 - 420.0  MHz   Fixed, Mobile Communications
           932 - 935    MHz   Fixed Communications
           941 - 944    MHz   Fixed Communications
   *       960 - 1215   MHz   NAVAID (TACAN/DME, etc.)
   * **    1030         MHz   Radar Beacon, TCAS, Mode S
   * **    1090         MHz   Radar Beacon, TCAS, Mode S
           1227.6       MHz   Global Positioning System (L2)
   **      1215 - 1400   MHz   Air Route Surveillance Radar
           1544 - 1545   MHz   Emergency Mobile Satellite Communications
           1545 - 1559   MHz   Aeronautical Mobile Satellite (R) (Downlink)
           1559 - 1610   MHz   GPS (L1), GLONASS
           1645.5 - 1646.5 MHz   Emergency Mobile Satellite Communications
           1646.6 - 1660.5 MHz   Aeronautical Mobile Satellite (R) (Uplink)
           1710 - 1850   MHz   Low Density Microwave Link
   **      2700 - 2900   MHz   Airport Surveillance Radar, Weather Radar
           2900 - 3000   MHz   Weather Radar
           3700 - 4200   MHz   ANICS (commercial satellite downlink)
           4200 - 4400   MHz   Airborne Radio altimeter
   *       5000 - 5250   MHz   NAVAID (Microwave Landing System)
           5350 - 5470   MHz   Airborne Radar and Associated Airborne Beacon
           5600 - 5650   MHz   Terminal Doppler Weather Radar
           5925 - 6425   MHz   ANICS (commercial satellite uplink)
           7125 - 8500   MHz   Radio Communications Link
           8750 - 8850   MHz   Airborne Doppler Radar
   **      9000 - 9200   MHz   Military Precision Approach Radar
           9300 - 9500   MHz   Airborne Radar and Associated Airborne Beacon
           11.70 - 12.20  GHz   FAATSAT (commercial satellite downlink)
           13.25 - 13.40  GHz   Airborne Doppler Radar
           14.00 - 14.50  GHz   FAATSAT (commercial satellite uplink)
           14.50 - 15.35  GHz   Television (Video) Microwave Link
           15.70 - 16.20  GHz   Airport Surface Detection Equipment (ASDE III)
           21.20 - 23.60  GHz   Microwave Link (Multi-use)
           24.45 - 24.65  GHz   Airport Surface Detection System (ASDE II)


   *  denotes AAG bands engineered by FAA; see NTIA Manual
   ** denotes those bands for which FAA is national coordinator;  see NTIA Manual
```

303. OFFICE OF SPECTRUM POLICY AND MANAGEMENT. The following are the major assigned functions for ASR:

a. **Focal point** within the FAA for all radio spectrum matters. Develops and executes FAA radio frequency spectrum policy, plans and standards.

b. **Engineers, obtains authorizations** and protects those frequency assignments necessary to satisfy the requirements of the National Airspace System (NAS).

c. **Provides engineering support** to regional and field facilities in the resolution and prevention of radio frequency interference to NAS facilities.

d. **Manages** the classified frequency management data and associated secure computer facility at Headquarters.

e. **Performs engineering analysis** of frequency assignment proposals by Government agencies, the FCC (for non-Government aviation use), Canada, Mexico and other countries to determine the impact on the NAS, and to preclude radio frequency interference to NAS facilities and services.

f. **Represents the agency** on the IRAC and other Government and industry spectrum management committees and working groups and Federal advisory committees which address spectrum issues.

g. **Serves as the manager** of aeronautical frequencies in the United States. Manages and engineers those aeronautical frequencies identified for AAG management and chairs that group. In addition, the NTIA has delegated band coordinator responsibilities to the FAA for radar (1215-1400, 2700-2900 and 9000-9200 MHz bands) and the radar beacon (1030/1090 MHz) systems.

h. **Assists in developing** the United States' position and inputs for use in various international fora. Represents the United States at those ITU and ICAO meetings which require frequency management technical expertise and which address or impact civil aviation matters.

I. **Maintains** the FAA radio frequency portion of the Federal Government's recovery communications (RCOM) mobilization plans.

j. **Conducts engineering studies** relating to incorporation of future communications, navigation and surveillance (CNS) systems within assigned portions of the radio spectrum in accordance with the NAS Capital Investment Plan (CIP) and FAA Research, Engineering and Development Plan.

k. **Executes** the electromagnetic radiation hazard measurement program, both ionizing and non-ionizing, for all FAA equipment and systems.

l. **Administers** the electromagnetic compatibility portion of the agency's airspace case program.

304. REGIONAL FREQUENCY MANAGEMENT OFFICE (FMO). The following are the major functions assigned to the regional frequency management office:

    a. Serves as the focal point within the region for all frequency matters.

    b. Investigates and resolves Radio Frequency Interference (RFI) problems.

    c. Validates and forwards frequency requirements with specific recommended frequencies to ASR.

    d. Performs electromagnetic compatibility studies.

    e. Performs radiation hazard measurements.

    f. Controls and maintains the regional RFI Monitoring Van (RFIM Van).

305. thru 399. RESERVED.